Amendments to the Claims

1. **(Currently amended)** A wireless communications system for transmitting/receiving a first wireless signal from a first wireless communications device and a second wireless signal from a second wireless communications device, the first and second wireless signals having different frequency bands from each other, wherein:

the first wireless communications device includes:

a first frequency converter ~~for downconverting~~ operable to downconvert the second wireless signal transmitted from the second wireless communications device to a first low-frequency signal;

a first sampler ~~for oversampling~~ operable to oversample the first low-frequency signal downconverted by the first frequency converter; and

a first demodulation digital circuit ~~for demodulating~~ operable to demodulate the signal oversampled by the first sampler;

the signal demodulated by the first demodulation digital circuit has a center frequency of fi [Hz];

the second wireless communications device includes:

a second frequency converter ~~for downconverting~~ operable to downconvert the first wireless signal transmitted from the first wireless communications device to a second low-frequency signal whose center frequency fd [Hz] is equal to a difference between a center frequency of the first wireless signal and that of the second wireless signal;

a second sampler ~~for undersampling~~ operable to undersample the second low-frequency signal downconverted by the second frequency converter; and

a second demodulation digital circuit ~~for demodulating~~ operable to demodulate the signal undersampled by the second sampler;

a sampling frequency used in the first sampler and that used in the second sampler are the same sampling frequency fs [Hz];

the sampling frequency fs [Hz] is set to a value that is an even-number multiple of a wireless symbol transmission rate such that oversampling is done in the first sampler and undersampling is done in the second sampler; and

the center frequency fi [Hz] is 1/2 to 1 times a frequency corresponding to a bandwidth of the first and second wireless signals and is $1/2^N$ (N is a natural number) times the sampling frequency fs [Hz].

2. **(Original)** The wireless communications system according to claim 1, wherein where the bandwidth of the first and second wireless signals is 2×Bch [Hz] and the wireless symbol transmission rate is fsym [Hz], the sampling frequency fs [Hz] and the center frequency fi [Hz] are expressed as shown in the following expressions:

$$fi = \frac{2kfsym}{2^N}$$

$$fs = 2^N fi$$

where k is an integer satisfying

$$\frac{fd+Bch}{(n+1)fsym} \leqq k \leqq \frac{fd-Bch}{n\,fsym} \qquad \cdots\text{Exp. } 12$$

and

$$k \leqq \frac{fd}{2fsym} \qquad \cdots\text{Exp. } 14$$

and N is an integer satisfying

$$\log 2\{\frac{fd+Bch}{(n+1)Bch}\} \leqq N \leqq \log 2\{\frac{2(fd-Bch)}{n\,Bch}\} \qquad \cdots\text{Exp. } 22$$

where n is an integer satisfying

$$1 \leqq n \leqq \frac{fd-Bch}{2Bch} \qquad \cdots\text{Exp. } 7$$

3. **(Original)** The wireless communications system according to claim 1, wherein:

the first frequency converter downconverts the second wireless signal transmitted from the second wireless communications device to a first low-frequency signal whose center frequency is fj [Hz]; and

the first low-frequency signal is demodulated by the first demodulation digital circuit after being corrected to a signal whose center frequency is fi [Hz] at a position preceding or following the first sampler.

4. **(Original)** The wireless communications system according to claim 1, wherein:

the center frequency fd is 40.000 [MHz]; and

the frequency fi and the sampling frequency fs are

fi=3.072 [MHz] and fs=24.576 [MHz],

fi=3.072 [MHz] and fs=12.288 [MHz],

fi=4.608 [MHz] and fs=36.864 [MHz],

fi=4.096 [MHz] and fs=32.768 [MHz], or

fi=3.584 [MHz] and fs=28.672 [MHz].

5. **(Currently amended)** The wireless communications system according to claim 1, wherein:

the first demodulation digital circuit includes:

a first quadrature demodulator ~~for quadrature-demodulating~~ operable to quadrature-demodulate the signal oversampled by the first sampler;

a first low-pass filter ~~for low-pass-filtering~~ operable to low-pass-filter the signal quadrature-demodulated by the first quadrature demodulator; and

a first received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal low-pass-filtered by the first low-pass filter;

the second demodulation digital circuit includes:

a second quadrature demodulator ~~for quadrature-demodulating~~ operable to quadrature-demodulate the signal undersampled by the second sampler;

a second low-pass filter ~~for low-pass-filtering~~ operable to low-pass-filter the signal quadrature-demodulated by the second quadrature demodulator; and

a second received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal low-pass-filtered by the second low-pass filter;

the first quadrature demodulator converts the signal oversampled by the first sampler to a signal including a component whose center frequency is zero; and

the second quadrature demodulator converts the signal undersampled by the second sampler to a signal including a component whose center frequency is zero.

6. **(Currently amended)** The wireless communications system according to claim 1, wherein:

the first demodulation digital circuit includes:

a first complex filter ~~for filtering~~ operable to filter, by using a digital filter, either one of a positive frequency component and a negative frequency component of the signal oversampled by the first sampler whose center frequency is closer to zero; and

a first received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal filtered by the first complex filter; and

the second demodulation digital circuit includes:

a second complex filter ~~for filtering~~ operable to filter, by using a digital filter, either one of a positive frequency component and a negative frequency component of the signal undersampled by the second sampler whose center frequency is closer to zero; and

a second received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal filtered by the second complex filter.

7. **(Currently amended)** The wireless communications system according to claim 3, wherein:

the first demodulation digital circuit includes:

a first quadrature demodulator ~~for quadrature-demodulating~~ operable to quadrature-demodulate the signal oversampled by the first sampler;

a first low-pass filter ~~for low-pass-filtering~~ operable to low-pass-filter the signal outputted from the first quadrature demodulator; and

a first received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal low-pass-filtered by the first low-pass filter;

the second demodulation digital circuit includes:

a second quadrature demodulator ~~for quadrature-demodulating~~ operable to quadrature-demodulate the signal undersampled by the second sampler;

a second low-pass filter ~~for low-pass-filtering~~ operable to low-pass-filter the signal quadrature-demodulated by the second quadrature demodulator; and

a second received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal low-pass-filtered by the second low-pass filter;

the first quadrature demodulator converts the signal oversampled by the first sampler to a signal including a component whose center frequency is zero; and

the second quadrature demodulator converts the signal undersampled by the second sampler to a signal including a component whose center frequency is zero.

8. **(Original)** The wireless communications system according to claim 7, wherein the frequency fj [Hz] is 3.000 [MHz].

9. **(Currently amended)** A wireless digital receiver in a wireless communications system for transmitting/receiving a first wireless signal from a first wireless communications device and a second wireless signal from a second wireless communications device, the first and second wireless signals having different frequency bands from each other, the wireless digital receiver receiving the second wireless signal in the first wireless communications device and digitally demodulating the second wireless signal, the wireless digital receiver comprising:

a frequency converter ~~for downconverting~~ operable to downconvert the second wireless signal transmitted from the second wireless communications device to a low-frequency signal whose center frequency is fi [Hz];

a sampler ~~for oversampling~~ operable to oversample the low-frequency signal downconverted by the frequency converter; and

a demodulation digital circuit ~~for demodulating~~ operable to demodulate the signal oversampled by the sampler, wherein:

a sampling frequency used in the sampler and that used in the second wireless communications device are the same sampling frequency fs [Hz];

the sampling frequency fs [Hz] is set to a value that is an even-number multiple of a wireless symbol transmission rate such that oversampling is done in the sampler and undersampling is done in a sampler of the second wireless communications device; and

the center frequency fi [Hz] of the low-frequency signal is 1/2 to 1 times a frequency corresponding to a bandwidth of the first and second wireless signals and is $1/2^N$ (N is a natural number) times the sampling frequency fs [Hz].

10. **(Original)** The wireless digital receiver according to claim 9, wherein where the bandwidth of the first and second wireless signals is 2×Bch [Hz] and the wireless symbol transmission rate is fsym [Hz], the sampling frequency fs [Hz] and the center frequency fi [Hz] of the low-frequency signal are expressed as shown in the following expressions:

$$fi = \frac{2kfsym}{2^N}$$

$$fs = 2^N fi$$

where k is an integer satisfying

$$\frac{fd + Bch}{(n+1)\,fsym} \leqq k \leqq \frac{fd - Bch}{n\,fsym} \qquad \cdots \text{ Exp. } 12$$

and

$$k \leqq \frac{fd}{2fsym} \qquad \cdots \text{ Exp. } 14$$

~~and N is an integer satisfying~~

$$\log_2\left\{\frac{fd + Bch}{(n+1)\,Bch}\right\} \leqq N \leqq \log_2\left\{\frac{2(fd - Bch)}{n\,Bch}\right\} \qquad \cdots \text{ Exp. } 22$$

where n is an integer satisfying

$$1 \leqq n \leqq \frac{fd - Bch}{2Bch} \qquad \cdots \text{Exp. } 7$$

11. **(Original)** The wireless digital receiver according to claim 9, wherein the center frequency fi and the sampling frequency fs are

fi=3.072 [MHz] and fs=24.576 [MHz],

fi=3.072 [MHz] and fs=12.288 [MHz],

fi=4.608 [MHz] and fs=36.864 [MHz],

fi=4.096 [MHz] and fs=32.768 [MHz], or

fi=3.584 [MHz] and fs=28.672 [MHz].

12. **(Currently amended)** The wireless digital receiver according to claim 9, wherein:

the demodulation digital circuit includes:

a quadrature demodulator ~~for quadrature-demodulating~~operable to quadrature-demodulate the signal oversampled by the sampler;

a low-pass filter ~~for low-pass-filtering~~ operable to low-pass-filter the signal quadrature-demodulated by the quadrature demodulator; and

a received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal low-pass-filtered by the low-pass filter; and

the quadrature demodulator converts the signal oversampled by the sampler to a signal including a component whose center frequency is zero.

13. **(Currently amended)** The wireless digital receiver according to claim 9, wherein the demodulation digital circuit includes:

a complex filter ~~for filtering~~ operable to filter, by using a digital filter, either one of a positive frequency component and a negative frequency component of the signal oversampled by the sampler whose center frequency is closer to zero; and

a received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal filtered by the complex filter.

14. **(Currently amended)** A wireless digital receiver in a wireless communications system for transmitting/receiving a first wireless signal from a first wireless communications device and a second wireless signal from a second wireless

communications device, the first and second wireless signals having different frequency bands from each other, the wireless digital receiver receiving the first wireless signal in the second wireless communications device and digitally demodulating the first wireless signal, the wireless digital receiver comprising:

a frequency converter ~~for downconverting~~ operable to downconvert the first wireless signal transmitted from the first wireless communications device to a low-frequency signal whose center frequency fd [Hz] is equal to a difference between a center frequency of the first wireless signal and that of the second wireless signal;

a sampler ~~for undersampling~~ operable to undersample the low-frequency signal downconverted by the frequency converter; and

a demodulation digital circuit ~~for demodulating~~ operable to demodulate the signal undersampled by the sampler, wherein:

a sampling frequency used in the sampler and that used in the first wireless communications device are the same sampling frequency fs [Hz]; and

the sampling frequency fs [Hz] is set to a value that is an even-number multiple of a wireless symbol transmission rate such that undersampling is done in the sampler and oversampling is done in a sampler of the first wireless communications device.

15. **(Original)** The wireless digital receiver according to claim 14, wherein where the bandwidth of the first and second wireless signals is 2×Bch [Hz] and the wireless symbol transmission rate is fsym [Hz], the sampling frequency fs [Hz] is expressed as shown in the following expression:

$$fs = 2k\,fsym$$

where k is an integer satisfying

$$\frac{fd + Bch}{(n+1)\,fsym} \leqq k \leqq \frac{fd - Bch}{n\,fsym} \qquad \cdots \text{Exp. } 12$$

and

$$k \leqq \frac{fd}{2fsym} \qquad \cdots \text{Exp. } 14$$

where n is an integer satisfying

$$1 \leqq n \leqq \frac{fd - Bch}{2Bch} \quad \cdots \text{Exp. } 7$$

16. **(Original)** The wireless digital receiver according to claim 14, wherein:

the center frequency fd is 40.000 [MHz]; and

the sampling frequency fs is 24.576 [MHz], 12.288 [MHz], fs=36.864 [MHz], fs=32.768 [MHz] or fs=28.672 [MHz].

17. **(Currently amended)** The wireless digital receiver according to claim 14, wherein:

the demodulation digital circuit includes:

a quadrature demodulator ~~for quadrature-demodulating~~ operable to quadrature-demodulate the signal undersampled by the sampler; and

a low-pass filter ~~for low-pass-filtering~~ operable to low-pass-filter the signal quadrature-demodulated by the quadrature demodulator; and

a received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal low-pass-filtered by the low-pass filter; and

the quadrature demodulator converts the signal undersampled by the sampler to a signal including a component whose center frequency is zero.

18. **(Currently amended)** The wireless digital receiver according to claim 14, wherein the demodulation digital circuit includes:

a complex filter ~~for filtering~~ operable to filter, by using a digital filter, either one of a positive frequency component and a negative frequency component of the signal undersampled by the sampler whose center frequency is closer to zero; and

a received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal filtered by the complex filter.

19. **(Currently amended)** A wireless digital receiver in a wireless communications system for transmitting/receiving a first wireless signal from a first wireless communications device and a second wireless signal from a second wireless

communications device, the first and second wireless signals having different frequency bands from each other, the wireless digital receiver receiving the second wireless signal in the first wireless communications device and digitally demodulating the second wireless signal, the wireless digital receiver comprising:

a frequency converter ~~for downconverting~~ operable to downconvert the second wireless signal transmitted from the second wireless communications device to a low-frequency signal whose center frequency is fj [Hz];

a sampler ~~for oversampling~~ operable to oversample the low-frequency signal downconverted by the frequency converter; and

a demodulation digital circuit ~~for demodulating~~ operable to demodulate the signal oversampled by the sampler after correcting a center frequency thereof to fi [Hz], wherein:

a sampling frequency used in the sampler and that used in the second wireless communications device are the same sampling frequency fs [Hz];

the sampling frequency fs [Hz] is set to a value that is an even-number multiple of a wireless symbol transmission rate such that oversampling is done in the sampler and undersampling is done in a sampler of the second wireless communications device; and

the center frequency fi [Hz] is 1/2 to 1 times a frequency corresponding to a bandwidth of the first and second wireless signals and is $1/2^N$ (N is a natural number) times the sampling frequency fs [Hz].

20. **(Original)** The wireless digital receiver according to claim 19, wherein where the bandwidth of the first and second wireless signals is 2×Bch [Hz] and the wireless symbol transmission rate is fsym [Hz], the sampling frequency fs [Hz] and the frequency fi [Hz] are expressed as shown in the following expressions:

$$fi = \frac{2kfsym}{2^N}$$

$$fs = 2^N fi$$

where k is an integer satisfying

$$\frac{fd+Bch}{(n+1)fsym} \leqq k \leqq \frac{fd-Bch}{n\,fsym} \qquad \cdots \text{Exp. } 12$$

and

$$k \leqq \frac{fd}{2fsym} \qquad \cdots \text{Exp. } 14$$

and N is an integer satisfying

$$\log_2\left\{\frac{fd+Bch}{(n+1)Bch}\right\} \leqq N \leqq \log_2\left\{\frac{2(fd-Bch)}{n\,Bch}\right\} \qquad \cdots \text{Exp. } 22$$

where n is an integer satisfying

$$1 \leqq n \leqq \frac{fd-Bch}{2Bch} \qquad \cdots \text{Exp. } 7$$

21. **(Currently amended)** The wireless digital receiver according to claim 19, wherein the demodulation digital circuit includes:

a quadrature demodulator ~~for quadrature-demodulating~~ operable to quadrature-demodulate the signal oversampled by the sampler;

an automatic frequency controller ~~for correcting~~ operable to correct the signal quadrature-demodulated by the quadrature demodulator to a signal having a component whose frequency is fi [Hz];

a low-pass filter ~~for low-pass-filtering~~ operable to low-pass-filter the signal frequency-corrected by the automatic frequency controller; and

a received data reproducing section ~~for reproducing~~ operable to reproduce received data from the signal low-pass-filtered by the low-pass filter.

22. **(Original)** The wireless digital receiver according to claim 19, wherein the frequency fj [Hz] is 3.000 [MHz].

23. **(Currently amended)** An integrated circuit for use in a wireless digital receiver in a wireless communications system for transmitting/receiving a first wireless signal from a first wireless communications device and a second wireless signal from a

second wireless communications device, the first and second wireless signals having different frequency bands from each other, the wireless digital receiver receiving the second wireless signal in the first wireless communications device and digitally demodulating the second wireless signal, the integrated circuit comprising:

a frequency conversion section ~~for downconverting~~ operable to downconvert the second wireless signal transmitted from the second wireless communications device to a low-frequency signal;

a sampling section ~~for oversampling~~ operable to oversample the low-frequency signal downconverted by the frequency conversion section; and

a demodulation digital section ~~for demodulating~~ operable to demodulate the signal oversampled by the sampling section, wherein:

the signal demodulated by the demodulation digital circuit has a center frequency of fi [Hz];

a sampling frequency used in the sampling section and that used in the second wireless communications device are the same sampling frequency fs [Hz];

the sampling frequency fs [Hz] is set to a value that is an even-number multiple of a wireless symbol transmission rate such that oversampling is done in the sampling section and undersampling is done in a sampler of the second wireless communications device; and

the center frequency fi [Hz] is 1/2 to 1 times a frequency corresponding to a bandwidth of the first and second wireless signals and is $1/2^N$ (N is a natural number) times the sampling frequency fs [Hz].

24. **(Currently amended)** An integrated circuit for use in a wireless digital receiver in a wireless communications system for transmitting/receiving a first wireless signal from a first wireless communications device and a second wireless signal from a second wireless communications device, the first and second wireless signals having different frequency bands from each other, the wireless digital receiver receiving the first wireless signal in the second wireless communications device and digitally demodulating the first wireless signal, the integrated circuit comprising:

a frequency conversion section ~~for downconverting~~ operable to downconvert the first wireless signal transmitted from the first wireless communications device to a low-frequency signal whose center frequency fd [Hz] is equal to a difference between a center frequency of the first wireless signal and that of the second wireless signal;

a sampling section ~~for undersampling~~ operable to undersample the low-frequency signal downconverted by the frequency conversion section; and

a demodulation digital section ~~for demodulating~~ operable to demodulate the signal undersampled by the sampling section, wherein:

a sampling frequency used in the sampling section and that used in the first wireless communications device are the same sampling frequency fs [Hz]; and

the sampling frequency fs [Hz] is set to a value that is an even-number multiple of a wireless symbol transmission rate such that undersampling is done in the sampler and oversampling is done in a sampler of the first wireless communications device.